THE PLANT DISEASE REPORTER

Issued by

THE PLANT DISEASE SURVEY, DIVISION OF MYCOLOGY AND DISEASE SURVEY
BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING
AGRICULTURAL RESEARCH ADMINISTRATION
UNITED STATES DEPARTMENT OF AGRICULTURE

Volume XXVIII November 1, 1944 Number 35

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

IN THIS ISSUE

Observations on Phloem Necrosis of Elm in Kentucky, Ohio, Indiana, and Illinois are reported by T. W. Bretz, page -1056.

E. M. Hildebrand summarizes the results of 4 years study on the effects of extra fertilization and drastic pruning on virus diseases of the Montmorency Cherry, page - 1057.

Howard W. Larsh reports diseases observed on Pecan in Oklahoma, page - 1060.

Diseases of Stored Crops in New England during the winter of 1943-44 are reported by Robert C. Cassell, page - 1062.

Robert C. Cassell reports on the condition and on diseases of Potatoes in Aroostook County, Maine, page - 1065.

G. M. Stone reports diseases on Pimento Peppers in Georgia, page - 1068.

Occurrence and control of Boron Deficiency affecting Rutabagas in southwest Virginia are reported by Edward K. Vaughan and G. M. Shear, page - 1069.

Oat disease survey in northern Pennsylvania is reported by John S. Niederhauser, page - 1072.

J. S. Tidd and G. H. Boewe send in a report of Corn diseases in North-central Illinois, page - 1077.

Rots of Runner Peanuts in southeastern Alabama are reported by G. M. Stone and Coyt Wilson, page - 1079. Alton E. Prince reports on diseases of Peanuts in North Carolina, page - 1080.

LIBRARY
CURRENT SERIAL RECORD
JAN 24 1945
U. S. DEPARTMENT OF AGRICULTURE

OBSERVATIONS ON PHLOEM NECROSIS OF ELM IN KENTUCKY, OHIO, INDIANA AND ILLINOIS

T. W. Bretz

As has been previously reported (PDR, 28, Nos. 30 and 31). Phloem Necrosis (a virus disease) has caused an extensive dying of elms in scattered localities in the State of Missouri. The disease has been particularly damaging in the cities of St. Louis and Kansas City, where the American elm, and its varieties, is extensively planted for shade tree purposes. The individuals concerned with the maintenance of plantings along the streets, boulevards, in the parks and real estate developments in these municipalities are greatly disturbed about the future prospects of their extensive elm plantings. A major problem facing these cities is the development of a plan of replanting that will provide desirable shade trees in areas where the elms have been destroyed by Phloem Necrosis.

Because the disease is new to Missouri and apparently has been present in the known locations for relatively few years, it is difficult to predict what its future course may be. However the disease has been known for some years in other States, notably Ohio and Kentucky, and it is thought to have been present in certain localities for many years, perhaps 50 years or more. It was therefore considered desirable to make observations in areas where the disease has been prevalent for some time in order to obtain an appreciation of its behavior over a period of years. With this in mind, from September 11 to 15, the writer, accompanied by Dr. C. M. Tucker of the Botany Department, University of Missouri and Mr. J. A. Denning, State Entomologist, travelled to Lexington, Kentucky, where Phloem Necrosis is thought to have been present for many years; Dayton, Ohio, where it has been known since 1927 and where it has been especially destructive this past season; and Columbus, Ohio, where the disease has also been very damaging in 1944. Dr. W. D. Valleau of the University of Kentucky gave generously of his time and his information regarding the behavior of the disease in that area. In Columbus, Mr. Roger U. Swingle of the U. S. Department of Agriculture Forest Pathology Field Station, and members of his staff, showed the progress of their research on the disease and pointed out, as well, some of the areas in the city where the disease has been most destructive.

Evidence of Phloem Necrosis of elms was observed at scattered points across southern Illinois and Indiana while enroute to Kentucky and upon the return trip from Ohio. In the vicinity of Lexington, Kentucky, the disease was observed affecting many planted trees ranging in age from 15 to 25 years. In this area, however, a number of native trees still survive which antedate the earliest supposed occurrence of Phloem Necrosis and which, presumably, have been intermittently exposed to it, as evidenced by the active development of the disease in younger trees in recent years. This strongly suggests that these trees are resistant to, possibly immune from, Phloem Necrosis. Evidence of the disease was observed along the route extending from Lexington, Kentucky to Cincinnati, Ohio. Between Cincinnati and Dayton, Ohio, the scarcity of elms was very noticeable, suggesting the possibility that few trees had survived earlier epiphytotics. In the latter city, the destruction of elms appeared to be almost complete. The number of dead and

dying trees exceeded the number of healthy specimens observed and it has been estimated that 20,000 trees have died in 1944 from Phloem Necrosis. In Columbus the disease has likewise destroyed many thousands of trees during the past season.

EMERGENCY PLANT DISEASE PREVENTION PROJECT

CAN THE ADVERSE EFFECTS OF VIRUS DISEASES BE CORRECTED BY EXTRA FERTILIZATION AND PRUNING THE MONTMORENCY CHERRY?

E. M. Hildebrand

In 1935 transmission experiments were begun at Ithaca, New York in an attempt to discover the cause of a degeneration condition present in Montmorency cherry and at that time ascribed to winter injury. About the same time a Wayne County cherry grower, in cooperation with the writer, started an extra fertilization and severe pruning program in an endeavor to correct the unprofitable, devitalized condition present in some trees in his orchard. The fertilization and pruning program was designed to replace the so-called winter-injured growth by vigorous new growth, regardless of its cause.

Materials and Methods

Extra fertilization involved an additional application of 5 pounds of a nitrogenous fertilizer, usually ammonium sulfate, to certain trees over and above the regular fertilizer applied broadcast and considered adequate for the ordinary needs of average trees.

At about fruit picking time an individual tree inspection was made and all trees falling below a profitable level of production received a durable mark consisting of a strip of paint about 3 inches wide on one side of the trunk starting below the lowest branch. Different colors were used in different years, namely, white in 1938, green in 1939, red in 1940, and yellow in 1941. On individual trees the succeeding paint strips were applied progressively downward on the trunk immediately below the preceding strip.

The extra pruning was of 2 kinds: either a severe cutting back of the branches, or dehorning of the trees for the purpose of building a new framework free from weak growth. In practically every case the drastic pruning was employed on trees which previously, simultaneously, or subsequently, received the extra fertilization treatment. Some of the trees that did not respond to the first type of pruning were dehorned.

In view of a leaf roll and marginal bronzing or scorch present on some of the trees in one part of the orchard, presumably due to potassium deficiency, an extra application of muriate of potash, 4 to 5 pounds per tree, was made 2 years in succession with beneficial results.

The fact that graft transmission was effected within 2 years, although confused with the presence of similar symptoms in some of the check trees that had come from the nursery, left little doubt as to the virus nature of the trouble. Moreover, regardless of whether winter injury was the primary or secondary cause, the above fact invited a detailed study of all the trees in the orchard.

This report summarizes the results of the detailed study covering the 4 years from 1938 to 1941, inclusive.

Experimental Results

Extra Fertilization. Judging by the individual tree inspections made once annually, approximately 24% of the trees in this orchard of 940 trees received the extra fertilization treatment each year between 1938 and 1941. A glance at Table 1 reveals the relatively uniform number of Montmorency cherry trees that were suffering from the devitalized condition commonly referred to as winter injury.

In Table 2A the trees are arranged according to the number of extra fertilizer treatments received during the 4-year period. The number of trees receiving 1, 2, 3, and 4 treatments was 120, 98, 65, and 98. Thus a total of 381, or 40% of the trees in the orchard, received extra fertilization one or more times.

The number of trees receiving the extra fertilization treatments that were removed from the orchard and replanted is shown in Table 2B. It can be seen at a glance that as the number of treatments per tree increased from 0 to 4 the percentage of removals during the experiment ranged from 1.2 to 33.7. It should be borne in mind that trees were removed when in an advanced stage of decline and no longer commercially productive.

Table 1. Montmorency cherry trees which reached an unprofitable stage of production from disease classified according to the year of extra fertilizer treatment.

Year	Color of Label	Trees	
		Number	Percent[1]
1938	White (W)	215	22.8
1939	Green (G)	226	24.0
1940	Red (R)	221	23.5
1941	Yellow (Y)	241	25.6

[1] Percentage based on total planting of 940 trees.

The relation between fruit yields in 1941 and the fertilizer case histories of the trees is summarized in Table 2C. The yield records taken at random from a sample of 75 trees shows that as the number of treatments per tree increased, which correspond in general to the stage of decline reached, the average yields decreased. Here it is important to point out that virus-infected trees gradually approach the more or less permanently unprofitable level of production through a decline in vitality resulting from the cumulative effects of the viruses plus the accompanying winter injury resulting therefrom. It is obvious then that the advanced degeneration condition of the trees and extra fertilization are practically synonymous, also that extra fertilization is really incapable of correcting the degeneration resulting from virus infections.

Table 2. Montmorency cherry trees arranged according to the number of extra fertilizer treatments received during the 4-year period, 1938 to 1941, in relation to treatments (A), removals (B), and yields (C).

A. Number of treatments					
	0	1	2	3	4
		W = 20	WG = 44	WGR = 32	WGRY = 98
		G = 9	WR = 4	WGY = 7	
		R = 25	WY = 3	WRY = 7	
		Y = 66	GR = 6	GRY = 19	
			GY = 11		
			RY = 30		
Totals					
Number	559	120	98	65	98
Percent	59.5	12.7	10.4	6.9	10.4
B. Trees removed and replanted under different treatments.					
Number	7	11	12	16	33
Percent[a]	1.2	9.2	12.2	24.6	33.7
C. Fruit yields in 1941 under different treatments[b].					
Number of trees	34	19	5	7	10
Yields in pounds	82.3	61.2	44.9	34.0	33.3

[a] Percentage is based on number of trees receiving treatments.

[b] In the random sample of 75 trees selected for taking fruit yields the so-called check trees had not received extra fertilizer treatments. However, many were diseased but none had reached the advanced stage of decline.

Severe Pruning. From observations it can be stated that severe pruning was incapable of permanently replacing the weak injured growth characteristic of virus-infected trees by temporary vigorous new growth. Some of the severely top-pruned trees showed what proved to be a temporary recovery, based on subsequent observations and records made the 3 seasons following the conclusion of this study. Dehorning was employed on a total of 23 trees. All but 2 of these trees were subsequently removed and replaced. The 2 trees allowed to remain as well as those receiving the extra fertilization treatment, although showing temporary improvement, have not recovered from virus infection. No permanent benefits resulted in trees receiving both extra fertilization and severe pruning. This can only lead to the conclusion that neither extra fertilization nor severe pruning can correct the

degeneration effects in Montmorency cherry suffering from virus diseases.

Discussion and Conclusions

From 1933 through 1937 a total of 109 trees, or about 11% of the orchard, were removed and replanted. For the subsequent period between 1938 and 1941 (Table 2) the corresponding number was 72. This is good evidence that the orchard was suffering from the same trouble for years past.

Pertinent to this study were the observations that not one but rather 4 virus diseases were present in this orchard - yellows, ringspot, green-ring yellows, and rosette. Green ring yellows and rosette were of minor importance, affecting only 8 and 2 trees. The trees showing definitely positive symptoms of yellows virosis in 1941 numbered 524, or 56% of the orchard, with an additional 265, or 28%, showing early stages of infection. The highly confusing element in the cherry virus complex is that of the ringspot virosis, which, after the initial shock, leaves the trees practically free from conspicuous external symptoms except for a mild ringspot on the unfolding leaves in the spring and a lowered vitality commonly called winter injury characterized by a stubby terminal growth. The only accurate appraisal of this disease is by indexing on young healthy cherry trees, which was done on about 1/4 of the trees in this orchard with about 38% positive. It is important to state that over 60% of the trees positive for ringspot were also affected by yellows virosis.

Finally it should be stated as a result of this study that extra fertilization and drastic pruning proved of no enduring benefit in combating the virus diseases at the root of the devitalized winter-injury condition arising therefrom.

PECAN DISEASES IN OKLAHOMA

Howard W. Larsh

In company with Mr. Lyman E. Coe, Inspector of the Oklahoma State Department of Agriculture, an extensive survey was made in most of the important pecan orchards throughout the State from October 12 to 26. Twenty-seven orchards were visited, consisting of approximately 8300 acres of which 2960 acres were surveyed.

Pecan growers have regarded the nut casebearer as the principal limiting factor in the development of the pecan industry in Oklahoma. In recent years, undetected by many of the growers, several fungal diseases have become severe enough to be considered at least potential limiting factors. One disease, pecan Scab (Cladosporium effusum), is, at the present time, by far the most destructive disease with which growers in this region have to contend, and unfortunately it is increasing in destructiveness each year. During this period Scab was found in varying amounts in every orchard surveyed. Very few, if any, seedlings or improved varieties were entirely free of leaf, twig, or nut infections. Many varieties showed considerable variation in susceptibility to Scab; however, no variety grown in this area was entirely resistant. Many of the eastern varieties were attacked less severely than the western varieties. Moderate to severe defoliation resulted from early infections on Halbert, Burkett, and Squirrel's Delight.

In many instances, complete defoliation had occurred on Halbert and Burkett. It was not at all uncommon to find from 60 to 100% of the nuts infected in these varieties. The following varieties were examined and found to be susceptible to Scab during the 1944 season in Oklahoma: Halbert, Burkett, Squirrel's Delight, Western Schley, Oklahoma, Williamson, Onliwon, Sovereign, San Saba Improved, Mahan, Moore, Moneymaker, Eastern Schley, Success, Stuart, and seedlings. It was estimated that a reduction of 20% of the pecan crop this season could be attributed to Scab.

According to several growers, as recently as 5 years ago it was very difficult to find Scab in any appreciable amount on the eastern varieties. These eastern varieties, until this relatively recent date were considered resistant to Scab in Oklahoma, but now are moderately attacked. Rapid increase and spread of this disease in the pecan orchards of the State suggests that new strains or races of the fungus have developed during the recent years, which may account , in part, for the increased infections and the virulence of the disease on the eastern varieties formerly considered resistant.

Two other diseases accounted for slight to moderate reduction in the photosynthetic surface of pecan leaves this season: (1) Downy Spot(Mycosphaerella caryigena) and (2) Vein Spot (Gnomonia nerviseda).

Downy Spot occurred in several of the pecan growing areas. The most severely infected orchards were observed near Muskogee, Okmulgee, and Okemah. Slight to moderate defoliation resulted from early infections in these areas. In Okmulgee County, in the Deep Fork Creek "bottom land" where climatological conditions are usually conducive to early infection by the Downy Spot organism, moderate defoliation had occurred and secondary infections showed abundant fruiting bodies of the imperfect stage (Cercosporella caryigena) on the under surfaces of the infected leaves. The variety Stuart was the most severely infected; however the varieties Burkett, Moneymaker, Success, and Western Schley had considerable spotting attributable to Downy Spot. Specimens identified by Mr. D. A. Preston verify the distribution of this fungus in 4 scattered areas of the State.

Vein Spot was more widely distributed than Downy Spot and resulted in moderate defoliation in several orchards. Leaf infections caused by the Vein Spot fungus were as prevalent and nearly as destructive as Scab. Because of the close resemblance of Vein Spot to Scab lesions on the leaves and petioles, specimens were taken from several orchards scattered throughout the pecan-growing regions of the State and examined with the microscope. This verified the previous list of infected orchards. There was very little variation in susceptibility of different varieties to attack by this fungus; however, Stuart, Success, Moneymaker, and San Saba Improved were heavily infected. This wide distribution of Downy Spot and Vein Spot suggests that they should be considered potential factors in the production of pecans in Oklahoma and diseases which growers must combat.

Brown Leaf Spot (Cercospora fusca) was found causing slight damage in several of the orchards surveyed. In most instances, the infected trees were not in a vigorous state of growth or had been partially covered with flood waters during the growing season. In a bottom-land orchard (Wagoner County) the variety Stuart and seedlings showed defoliation due to Brown Leaf Spot.

Powdery Mildew (Microsphaera alni) was more apparent on the nuts this year than last. Several of the growers expressed concern regarding the superficial white growth on the nuts. Since the disease did not become

noticeable on the leaves and nuts until rather late in the growing season, very little loss was anticipated.

Rosette (Nutritional). Typical symptoms of rosette were seen in only 3 localities and were limited to only a few affected trees. In an orchard near Okemah, earlier in the growing season, several trees showed characteristic symptoms of Rosette; however, the grower applied a zinc sulfate treatment to the affected trees which corrected the nutritional disturbance and eliminated the Rosette symptoms.

Nursery Blight (Elsinoë randii) was collected from 2 nurseries and a one-year-old planting. The most severely infected trees were observed in a home nursery near Verdigris (Wagoner County) where nearly every nursery tree showed the Sphaceloma stage of the disease.

EMERGENCY PLANT DISEASE PREVENTION PROJECT.

DISEASES OF STORAGE CROPS IN NEW ENGLAND DURING THE WINTER OF 1943-44

Robert C. Casell

POTATO

The greatest storage loss of potatoes in New England occurred in Maine. Vermont also averaged a heavy loss, but comparatively, not like that of Maine. Very little loss occurred to native potatoes stored in the other States.

Maine. According to information obtained from the State Inspection Service there was a recorded shrinkage loss of 20% of the table stock potatoes in Aroostook County, and 30% for the certified seed. These figures do not represent the thousands of bushels of table stock dumped directly at the farm and other places of which there were no available records. It seems quite likely that the over-all storage loss in Aroostook County was about 25%, representing some 18,000,000 bushels. Late blight (Phytophthora infestans) was probably the greatest contributing factor to the heavy loss. Blight alone probably accounted for nearly 10% of the loss. Other major contributing factors were, external slimy soft rot (bacterial), field frost, field sunburn, and hollow heart (physiogenic). Other less important, but contributing causes of loss, were ringrot (Corynebacterium sepedonicum), net necrosis (leaf roll virus), black leg (Erwinia phytophthora), stem-end browning (cause unknown) and scab (Actinomyces scabies). The relative amount of loss caused by each factor was in about the order listed, although it was hard to tell with certainty. However, many of the factors were aggravated to serious proportions by the wet, crowded storage houses.

In the Central Maine area storage losses were about 20 or 22% and late blight again constituted the major portion of loss.

Because of the extraordinarily large potato crop produced in Maine in 1943 a large quantity had to be shipped to near-by States for temporary storage. Several such storages in Massachusetts, New Hampshire, Connecticut, and Rhode Island were seen where losses were also quite heavy. Some of the auxiliary storages were adequate for potatoes, but most of them were converted warehouses or other storages not entirely suitable for potatoes. About 50,000 bushels of Maine potatoes were stored in a warehouse in Dover, New Hampshire, where it was estimated that about 20,000 bushels were lost. At Warehouse Point, Connecticut, a complete storage of

25,000 bushels was lost. At Hawley, Massachusetts, 25% of a 10,000 bushel storage was lost. At Providence, Rhode Island, only one car out of 40 was lost. In all of these storages, and others too, late blight, external slimy rot, and field frost were the principal factors contributing to the breakdown.

Rots characteristic of storage potatoes were also carried into transit shipments with corresponding losses. Many cars which left Maine grading 1 to 2% defects, arrived at their destination with 40 to 75% breakdown. External slimy rot (bacterial) was particularly active in transit breakdown. Late blight, and ringrot were also important causes of breakdown.

Vermont. The commercial potato warehouses of Vermont suffered about an 18% storage loss, which was approximately twice as great as that of an average year. Almost 75% of the storage loss could be attributed to late blight and associated complications. Other contributory factors were bin rots caused by secondary bacteria and heating, net necrosis, stem-end browning, and hollow heart. Only occasional bins were found where any noticeable loss was cuased by ringrot, black leg, scab, hollow heart, and field frost.

New Hampshire. The loss in New Hampshire potato storages was probably no more than occurs in any normal year. A little more loss occurred in the Coos County area than in the Southern part of the State, due to the presence of a small amount of late blight. Excluding one bin which had a 35% loss from blight rot, 14 bins averaged only 1.8% tuber blight. Traces of other loss in scattered bins were attributed to black leg, scab, net necrosis, stem-end browning, growth cracks (physiogenic), hollow heart, field frost, and field sunburn.

Massachusetts, Connecticut, and Rhode Island. These States experienced storage losses comparable to normal years or less. In the Connecticut River Valley of Massachusetts in Hampshire and Franklin Counties there was a slight loss from late blight, but probably less than 1%. There was only a trace of late blight in Hampden and Bristol Counties to the south, and none at all in the States of Connecticut and Rhode Island. Net necrosis, although of no real consequence in Massachusetts and Connecticut, was more prevalent there than in Rhode Island. More loss was caused in Connecticut and Massachusetts by scab than by late blight. In Connecticut the greatest loss was caused by wire worms. Rhode Island experienced the least loss of any of the New England States; losses there amounting to one or two barrels to a carload of potatoes.

APPLES

Scab (*Venturia inaequalis*) was by far the most prevalent disease of stored apples. Storages throughout New England ranged from a trace to 18 and 20% infected apples, with a probable average of about 5%. Scab was the least severe in Connecticut and Rhode Island and the most severe in Vermont and Maine.

Blue mold (*Penicillium expansum*) was present in storages throughout New England. In some areas blue mold could be found in all storages and in other areas it was scarce. Prevalence ranged from a trace to 15%. Average prevalence for the area was probably around 2%.

Sooty blotch (Gloeodes pomigena) was more prevalent than usual in Southern Maine and Northeastern Massachusetts. Local prevalence ranged up to 75% with severity heavy. Sooty blotch was of no special importance in the other areas.

Bitter pit (physiogenic) appeared to be most severe in Connecticut where prevalence in storages ranged from a trace to 20% with an average of about 5%. Elsewhere throughout the area, except for scattered heavier cases, bitter pit probably averaged about 1% on susceptible varieties.

Other diseases which were found causing losses of 1% or less in isolated areas were Rhizopus rot (Rhizopus nigricans), black rot (Physalospora malorum)[P. obtusa], Botrytis rot (Botrytis sp.), and storage scald (physiogenic).

SQUASH

Squash storages are almost wholly concentrated in Northeastern Massachusetts and Southern New Hampshire. Loss in storages varied from 2% to 35%. In Massachusetts the average loss was probably 10 to 15% and in New Hampshire the average was nearer 18 to 20%.

Black rot (Mycosphaerella citrullina) was by far the most widespread and destructive of all squash diseases. In the Massachusetts storages prevalence ranged from a trace to 50% with an average of about 11%. In New Hampshire its prevalence ranged from 2 to 48% with an average of about 24%. Black rot was also the most prevalent disease in one small storage in Connecticut.

Rhizopus rot (Rhizopus nigricans) was the second most prevalent disease in the New Hampshire houses, but in Massachusetts it was not so common as Fusarium rot and bacterial wilt. In New Hampshire Rhizopus rot was present in all storages. Prevalence ranged from a trace to about 4% with an average of 1.5%. In Massachusetts Rhizopus rot was found in only 2 houses with an average prevalence of about 1%.

Bacterial wilt rot (Erwinia tracheiphila), probably occurred as the second most destructive disease of stored squash in Massachusetts, but only about 1% was found in one house in New Hampshire. In Massachusetts bacterial wilt was found in two-thirds of the houses and ranged from a trace to 4% in prevalence with an average of about 1.5%. A trace was also found in one Connecticut storage.

Fusarium rot (Fusarium sp.) occurred in a little less than half of the Massachusetts storages. It ranged in prevalence from a trace to 4% with an average of less than 1%. Only a trace was found in one storage in New Hampshire.

Botrytis rot (Botrytis cinerea) occurred in about a quarter of the Massachusetts storages and about half of the New Hampshire storages. Where Botrytis rot occurred its average prevalence in Massachusetts was about 2% and in New Hampshire 2.5%.

Other diseases of less economic importance found as a trace only in 3 storages or less were as follows, scab (Cladosporium cucumerinum) in Massachusetts, and rot caused by Sclerotinia sclerotiorum in New Hampshire, and Alternaria sp. in New Hampshire and Massachusetts.

CARROTS

Eight carrot storages were under observation in Massachusetts. Carrots in general kept exceptionally well in this area as the crop was harvested under favorable and dry conditions.

Watery soft-rot (Sclerotinia sclerotiorum) was the most prevalent and destructive disease; it was found in 5 houses and prevalence ranged from a trace to 2%. Severity was not great except that occasional rot pockets developed.

Bacterial soft-rot (Erwinia carotovora). Small amounts were found in 4 storages ranging in prevalence from a trace to 1%.

Black rot (Alternaria radicina) [Stemphylium radicinum] was found in only one storage. Prevalence was about 1%.

ONIONS

Demand was so great for onions that very few were held in storage for any length of time. Three storages were under observation in Massachusetts. Total storage losses were not over 3 to 4% at the most.

Fusarium bulb rot (Fusarium sp.) probably caused the greatest single loss. It was present in 2 storages and averaged about 1.3%.

Bacterial bulb rot (Phytomonas [Pseudomonas] alliicola) was found in all 3 storages and averaged about 0.75% in prevalence.

Other diseases averaging 0.5% or less in prevalence were Botrytis neck rot (Botrytis allii), Botrytis sp., and Penicillium sp.

PARSNIPS

The following diseases were present as a trace only in the Danvers, Massachusetts, storages.

Watery soft-rot (Sclerotinia sclerotiorum) was found in 2 storages.

Rust (cause unknown) was found in one house.

Shoulder injury. A slight amount was found in one house caused by secondary fungi and bacteria following harvesting injury and frost damage.

TURNIPS

Six large storages were inspected in Middlesex, Essex and Bristol Counties in Massachusetts. All storages were in good condition. One storage had an occasional turnip with Rhizopus rot, while cut surfaces of the turnips in another house were covered with mold, but decay had not set in. Another house had a trace of club root (Plasmodiophora brassicae) present. Both black rot (Xanthomonas campestris) and soft rot (Erwinia carotovora) were totally absent, reflecting the unusually dry conditions under which the crop was produced and stored.

EMERGENCY PLANT DISEASE PREVENTION PROJECT.

CONDITION AND DISEASES OF POTATOES IN ARCOSTOOK COUNTY, MAINE

R. C. Cassell

Potato yields in Aroostook County this year are not up to those of last year but a much cleaner crop has been produced which will keep and ship

much better. Heavy freezes have been delayed this year and fall rains have not been excessive. Labor was more effectively organized and with approximately 10,000,000 bushels less to dig the County's crop is mostly out of the ground. There may be 1,000 to 2,000 acres yet to be dug, but last year there were 15,000 acres to be dug at this date, 5,000 acres of which were never dug.

The 1944 season in Aroostook County was comparatively dry for the region. The drought was expressed as being the most severe in the memory of the present generation. Potato yields were 25 to 30 barrels less per acre than last year's yields over most of the County. Yields ranged, as an average, from 65 to 70 barrels per acre in Houlton to 125 to 130 barrels in Madawaska and Ft. Kent, with a County average somewhere around the 100 barrel mark.

Losses in field and bin seem to be caused almost entirely by Late Blight, Bacterial Ringrot, Net Necrosis, Blackleg and field Frost.

Late Blight (Phytophthora infestans). A surprising amount of tuber Blight has been encountered in digging and later in the bins. In a survey made September 1, Blight could not be found in the County except in the St. John River Valley. Obviously, then, blight appeared late in the County as well as in the State as a whole; it is quite likely that the disease appeared in many fields after spraying had been discontinued as digging of the early varieties had begun September 1.

Late Blight appears to have been heaviest in the Houlton area in the southern part of the County and in the St. John River Valley in northern Aroostcok. Light to moderate scattered infections occurred throughout the remainder of the County. At Houlton it was reported that some fields had as high as 10% tuber rot at digging time. In Littleton more tuber rot was found to be present this year than last and in Smyrna Mills an operator reported more blight rot to be present this year than in a great many past years. Two bins of early dug potaotes seen in Houlton were breaking down and becoming wet with 50 to 60% blight rot. Secondary surface Bacterial Rot had also become active. One car of potaotes shipped from Houlton left there graded 1% defects and arrived in Pittsburg, Pennsylvania with 40% blight breakdown.

Dr. M. R. Harris surveyed 25 fields representing 420 acres in Frenchville at digging time and found blight tuber rot to be present in the following proportions: 4 fields with none, 11 fields with a trace, 8 fields with 1 to 5%, one field with 10%, and one field with 25%. Dr. Harris found that where the fields had been sprayed 5 times or less tuber blight rot was present in varying amounts. Where the fields had been sprayed 6 times or more the tubers were practically free of blight rot. In one field where no spraying had been done this crop loss amounted to about one-half. One very wet and disintegrating bin was seen in Ft. Kent. This was a late dug bin of Katahdins which had about 2% tuber blight rot, 5% ringrot and 13% field frost. Secondary bacterial rots had set in but these were not the surface slimy rots characteristically present in the bins last year.

In Ft. Fairfield some bins of early dug Katahdins were found with 30 to 35% tuber blight rot. However, throughout the County it was not only the early dug potatoes that had moderate proportions of tuber blight rot but in many cases the late dug potatoes were heavily infected. It is impossible at this date to determine the exact cause of tuber infection in the case of the late dug potatoes where the tops were supposedly dead for the required length of time before digging, but it is quite likely that the heavy rains preceding and during the hurricane of September 14 washed the

fungus spores into the soil and into contact with the tubers. This condition was known to occur in the Massachusetts potato fields and it is quite possible that the same conditions existed in Maine.

Bacterial Ringrot (Corynebacterium sepedonicum) is apparently more widespread in Aroostook this year than at any other time. It appears to be less prevalent in Houlton than farther north, yet more widespread this year than previously. However, in Littleton, to the north of Houlton, one grower had about 40% ringrot in his Katahdins, which were claimed to have been planted from certified seed. Estimates are to the effect that between 1 and 3% of the Aroostook potato crop this year was infected with the ringrot organism. Ringrot was found in 6 of 15 fields examined in Ft. Fairfield, Limestone, Presque Isle, Madawaska, Ouellette, Washburn, Houlton, and Smyrna Mills. Severity averaged about 1.5% in the 6 fields. This prevalence, however, could not be considered representative as the fields were seen at the very end of the digging season when the growers were in their last fields to be dug. Usually the poorest field, for one reason or another, is left to the last.

Dr. Harris made an intensive survey for ringrot this fall in the town of Easton. This is the third year such a survey has been made in Easton, a representative town in Aroostook County where an educational clean-up campaign has been rather intensively carried to the farmers. This work in Easton started in 1941. In the present survey Dr. Harris examined 1,513 acres belonging to 62 growers: 1235 acres were found to be free from ringrot, and 278 acres were found to have a trace or more. Of the 278 acres, 207 acres had only a trace, 9 acres had 0.5%, 27 acres had 1% and 35 acres had 5%. Dr. Harris found the ringrot situation in the central Maine area of Piscataquis County to be better. In surveying 768 acres belonging to 25 growers he found 695 acres to be free of ringrot while 73 acres had only a trace.

Dr. Harris also stated that in the St. John River Valley from Van Buren to Ft. Kent he believes 80% of the growers had at least a trace or more of ringrot in their fields. In most cases damage was not great but the potential danger of ringrot is there. One inspection agency in surveying 25 to 30 fields in the Ft. Kent area found only 4 fields free of ringrot. Some fields had 50 to 60% and fields which had been entered for certification had up to 5%. An operator in Madawaska estimated that 40% of the fields there would have 1 to 3% ringrot and that ringrot was definitely more widespread and damaging this year than at any previous time.

The Federal-State Inspection Service kindly submitted the inspection records of ringrot and late blight from representative areas of the County for the 2-day period of October 18 and 19, shown in Table 1. These inspections are made at the shipping point of graded potatoes as they are loaded for shipment.

The table gives an idea of the distribution of ringrot and late blight in the County this year and the comparative presence of each after grading. It so happens that on the 2 days selected no ringrot was found at Limestone. In selecting any other 2 days this absence of ringrot could possibly have occurred at any other one of the towns.

Net Necrosis (Leaf-Roll Virus) is beginning to appear in apparently serious amounts in the Green Mountains. It was found in 7 of 10 lots examined with an average of 7.5% in severity for the 7 lots. An inspector in Ft. Fairfield stated that net was just beginning to appear there but some bins were already averaging 35%.

Table 1. Percentage of ringrot and late blight by carload lots of table stock (after grading) October 18 and 19.

Town	No. of cars represented*	Average percent ringrot	Average percent late blight
Ashland	4	.15	.28
Limestone	7	0.0	.04
Island Falls	5	.18	.56
Frenchville	8	.43	.46
Caribou	12	.26	.12
Ft. Kent	8	.46	.19
Washburn	5	.38	.46
Presque Isle	6	.70	.33
Mars Hill	3	.17	.43

*One to 15 sources represented per car.

Blackleg (Erwinia atroseptica) [E. phytophthora] was found in 4 of 15 fields. Only a trace was present in 3 fields but between 1 and 2 per cent was present in the fourth.

Field Frost is present in some fields and bins in small amounts. A trace to 2% was found in 8 of 15 fields at digging time. It was found in 3 houses, a trace in one, about 2% in another and about 13% in the one house previously mentioned in Ft. Kent.

EMERGENCY PLANT DISEASE PREVENTION PROJECT.

DISEASES OF PIMENTO PEPPERS IN GEORGIA

G. M. Stone

The Pimento pepper acreage in the Griffin area is somewhat lower this year than in 1943; however, the yield and quality is considerably better.

Southern Blight (Sclerotium rolfsii) is one of the major diseases of the Pimento pepper in Georgia. The annual loss from this disease is about 10% and according to the growers and canners, the loss is fairly constant from year to year. Mr. Lewis, in charge of production for the Pomona Products Company at Griffin, said, "We anticipate about 10% loss from 'Blight' each year and make allowances for it. It is the unpredictable things such as Cercospora and bacterial leaf spots that bother us most."

Cercospora leaf spot (C. capsici) was somewhat less severe this year than last; however, the disease caused heavy leaf shedding in a number of fields fairly early in the season and again late in the season. The loss or damage caused by Cercospora depends to a great extent on the stage of development of the plant and on the weather conditions that follow. If leaf shedding takes place early in the season, recovery is slow, or if it occurs when the weather is hot and dry, much damage will result from sun scald. Shedding in October is somewhat beneficial for it hastens fruit ripening. The disease as it occurred this year is somewhat puzzling. At the time of the survey, during the week of October 16, a great many fields were severely attacked, while others in the same communities showed no defoliation. The

differences could not be traced to the seed, seed treatment, cultural practice, weather conditions, or associated diseases such as nematodes and Southern Blight. The explanation would probably be found in factors such as soil type, texture, fertility, etc., that might affect the general growth of the plants.

Only scattered infections of Bacterial Spot (Xanthomonas vesicatoria) were found. This disease was quite bad last year.

A severe attack of Anthracnose (Colletotrichum nigrum) was found in an 8-acre field. The disease started in a small area near the center of the field and spread to the rest of the plants. At the time of my visit, at least a ton of peppers were on the ground, with a high percentage of the green pods on the plants affected. The grower stated that he had grown peppers in the same field 3 years ago, and had lost practically the entire crop from the same trouble. This was the only field where Anthracnose was found.

Ripe Rot (Vermicularia capsici) was found to be more prevalent this year than last; however, the amount did not exceed 1%.

Mosaic (Virus) usually considered negligible in the area, was of major importance this year. Mosaic is usually found generally in most fields late in the season and apparently causes little damage. This season a high percentage of the plants in quite a few fields became infected early in the season and caused shedding of the first crop of blooms. The subsequent hot-dry weather seemed to check the disease and the plants grew out of it.

The loss from all diseases in the area this year is estimated to be about 20%.

EMERGENCY PLANT DISEASE PREVENTION PROJECT

BORON DEFICIENCY OF RUTABAGAS IN SOUTHWEST VIRGINIA

Edward K. Vaughan and G. M. Shear

During the summer of 1943, C. F. Taylor who was then working on the Federal Emergency Plant Disease Prevention Project in Virginia, was inspecting cabbage and other crops in Smyth County, when a condition of rutabagas, known as watercore, was called to his attention. Affected plants were characterized by a watersoaked appearance of the root which started in the center and gradually extended toward the outside. The affected tissue in extreme cases was cracked and rotted, and the skin of affected roots was in many cases rough and bark-like. These symptoms were diagnosed as those caused by a deficiency of boron, although boron was not known to be deficient in the soils of that region.

In order to be sure that the diagnosis of the trouble was correct, and if so to determine how much borax should be used to prevent watercore, an experiment was planned in 1944, to be conducted on 2 farms in fields where the disorder was known to have occurred. The farmers were found to be very cooperative, one even plowing a section of his wheat field to plant rutabagas for the experiment. The borax treatments were applied to the randomized plots as a side dressing on May 30, when the plants were very small. Borax was applied at the rate of 10 pounds per acre and 20 pounds per acre.

Several weeks after the treatments were applied, an article on boron deficiency in rutabagas in Canada[1] was received, showing that in some soils borax at the rate of 100 pounds per acre failed to prevent watercore, but that spraying the leaves with a 2% solution of borax did control it. Not knowing what to expect of the soil where this experiment was being conducted, it was decided to spray some extra plots adjoining those already treated. This was done July 6, at which time some rutabagas already showed signs of watercore although they were only a little over an inch in diameter.

The rutabagas in the experimental plots were harvested on August 11. Yields were obtained, and all rutabagas were cut in half and examined for watercore. The application of borax did not cause a significant increase in yield (Table 1), but it had a marked effect on the development of watercore. In one field 18% of the rutabagas from the untreated plots had watercore, whereas only 5% from the plots receiving 10 pounds of borax per acre, and only 1% from plots receiving 20 pounds per acre, were affected. The soil where these plots were located is a very dark silt loam, level, and poorly drained. In the other field 94% of the rutabagas from the untreated plots, 3% of those from the plots that received 10 pounds per acre, and only 0.5% of those from the plots that received 20 pounds per acre, developed watercore. These plots were located on a hillside and the soil was a heavy clay loam.

Table 1. Yield and Percentage of Rutabagas affected with Watercore

	Borax rate per acre		
	0 lb.	10 lb.	20 lb.
O. D. Williams farm			
Heavy clay loam soil			
Yield pounds per acre	9163	11925	12019
Percent watercore	93.7	3.3*	0.45*
O. H. Hendlite farm			
Dark silt loam soil			
Yields pounds per acre	6961	7913	8597
Percent watercore	18.3	4.6*	1.1*

	Unsprayed	Sprayed
O. D. Williams farm	89.9	44.4*

* Indicates treatment gave significantly less watercore than untreated plots.

Both rates of borax application resulted in significantly less watercore than occurred where no borax was used; and although the 20-pound applications reduced its occurrence more than the 10-pound applications, the difference between them was not great enough to be significant.

[1] J. D. MacLachlan. Control of water-core of turnips by spraying with borax. Sci. Agr. 24(7): 1944.

The results of the soil treatments were more marked than those of the spray treatment. Forty-four percent of the rutabagas from the sprayed plots developed watercore, while 90% of those from the unsprayed plots were affected. If an earlier spray had been applied it is probable that much less watercore would have developed. The watercore in the rutabagas from the sprayed plots was less severe than that in the crop from the unsprayed plots, indicating that although watercore was probably present at the time the spray was applied its further development was prevented. However, since application of the borax in the fertilizer would not require an extra operation by the grower, that method of borax application is preferable provided that seedling injury does not occur from placing the borax too near the seed.

One grower in 1944 used a fertilizer containing borax on his entire rutabaga crop. He based his treatment on the recommendations for the use of boron on rutabagas and other crops in Virginia and elsewhere. The fertilizer contained 100 pounds of borax per ton and was applied at the rate of 400 pounds per acre, giving an application of 20 pounds of borax per acre. No watercore was found in the rutabagas in this field, which was only 200 yards from the field where over 90% of the untreated plants developed the disorder. Two other growers used fertilizer containing boron on part of their crop. Watercore was not found in the treated section of the fields but it was present in the untreated section of these fields.

A survey of the area in Smyth and Wythe Counties where rutabagas are grown was made, with the assistance of R. E. Atkinson of the Federal Emergency Plant Disease Prevention Project. Plants affected with watercore varied from 0.0 to over 90% in different fields, with an estimated average of 10% of the crop affected.

Why has boron deficiency of rutabagas been reported from this area only for the last two years? A study of the rainfall records for this vicinity showed that in both 1943 and 1944 the rainfall for June and July was only two-thirds normal. Since it has been shown that boron deficiency is usually more severe during periods of drouth[2], it would naturally be expected that rutabagas, which are more sensitive to boron deficiency than most crops, would show the deficiency symptoms during dry years if the soil was lacking in this element. Inquiry among the rutabaga growers disclosed that they had observed watercore from time to time over a period of years.

Since watercore was so prevalent in rutabagas, cabbage which is usually grown in the same fields with rutabagas was examined. Scattered plants showed a watery circle in the middle of the stem when the heads were cut and in a number of cases hollow brown areas in the center of the stem were noted. No data were obtained on the possible effect of this deficiency on the value of the cabbage.

From an economic standpoint the quality and not the yield is the important thing to be considered in the case of boron deficiency of rutabagas. Where only a few of the rutabagas in a field show slight symptoms of watercore, the value of the crop is not seriously affected, but where the percentage of affected plants is high and the watercore reaches an advanced

---

[2] G.J. Raleigh, O.A. Lorenz, C.B. Sayre. Studies on the control of internal breakdown of table beets by the use of boron. Cornell Univ. Agr. Exp. Sta. Bul. 752. 1941.

stage the entire crop may be lost. The cost of insuring against watercore is so small that one who is growing rutabagas in an area where the disorder is prevalent cannot afford to use fertilizer without borax on this crop. On the basis of the results discussed here borax applied at the rate of 10 pounds per acre should be sufficient. The reason for recommending 10 pounds rather than 20 pounds is to avoid the possibility of causing injury. While boron in minute amounts is essential for the normal growth of plants, large amounts are injurious; therefore, the smallest amount of borax that will control the disorder should be used.

VIRGINIA AGRICULTURAL EXTENSION DIVISION AND VIRGINIA AGRICULTURAL EXPERIMENT STATION, COOPERATING.

OAT DISEASE SURVEY IN NORTHERN PENNSYLVANIA

John S. Niederhauser[1]

From July 19 to 22 and August 1 to 5 a survey was made of the diseases of oats in the northern tier of counties in Pennsylvania (Susquehanna, Bradford, Tioga, Potter, McKean, Warren, Erie, and Crawford). A total of 133 fields covering 944.5 acres were surveyed. As a rule the fields were selected at random while travelling through the survey area. In each field counts and estimates were made as to the prevalence and severity of the loose and covered smuts, crown rust, Helminthosporium leaf blotch, and blast. In addition, an effort was made in each case to obtain information about the acreage, planting date, previous crop, stage of development (flower, milk, dough, etc.), variety, source of seed, and seed treatment.

As to stage of development, the fields included in the survey varied from those with plants still in the "boot" to those where the plants were mature. The number of fields in each stage of development is as follows:

Boot	2
Flower	38
Milk	41
Early dough	26
Late dough	15
Mature	11

The principal varieties seen on the survey, and the number of fields of each are as follows:

Cornellian	20	Ithacan	3
Patterson	16	Beaver	3
Victory	15	Virland***	7
Stiffstraw**	5	Boone***	3
Richland	3	Tama***	1

** Probably Michigan Worthy
*** Leaf-rust resistant

[1] The writer wishes to thank Dr. L. J. Tyler and Dr. M. F. Barrus of the Department of Plant Pathology, Cornell University, Ithaca, N. Y., for helpful advice and criticisms in the preparation of this report.

Stem rust (Puccinia graminis), scab (Gibberella zeae), and halo blight (Pseudomonas coronafaciens) were rare on oats in this area in 1944. Anthracnose (Colletotrichum graminicolum) and powdery mildew (Erysiphe graminis) were not seen.

Loose and Covered Smuts (Ustilago avenae and U. kolleri).

No differentiation was made between the loose and covered smuts in the field counts, since it was often so difficult in individual cases to definitely tell which of the two smuts was present. By rough estimate, about 70% of the oat smut seen was attributed to U. avenae and about 30% to U. kolleri. In a given field, smut percentages were calculated from random samples, each consisting of 50 stalks in a row. The number of samples varied from 5 to 10, depending upon the size of the field. Thus 250 to 500 plants were taken as the field sample. Where no smutted plants were included in the counts, but smutted heads were seen in the field, the amount present was marked as a trace. In computing averages, traces were considered as 0.

Where the seed was treated with formaldehyde or Improved Ceresan, the control of both smuts was good. This is illustrated in the following table:

Table 1

Treatment	No. fields	Acres	% Smut Based on No. fields	% Smut Based on No. acres
Ceresan	32	359.5	0.16	0.11
HCHO	26	152	0.19	0.16
Total seed treatment	58	511.5	0.17	0.12
No seed treatment	46	273	4.6*	5.3**
Unknown	29	160	2.3	1.4
	133	944.5		

* Based on 45 fields; one field too young for smut reading
** Based on 270 acres; one field too young for smut reading

From the smut percentages based on the number of acres, it may be estimated that the oat smuts were reducing the yields 1.8% this year in the northern tier counties of Pennsylvania. The rather low percentage of smut (4.6 or 5.3%) in fields planted with untreated seed might be explained by the fact that an attempt is usually made to take seed oats from relatively smut-free fields. Or it might have been that conditions for flower inoculation in the seed crop were unfavorable. It is also possible that the low temperature and/or the high moisture content of the soil at seeding time exercised a repressive effect on the oat smut organisms. Bartholomew and Jones[2] and later workers have established the fact that these soil environmental factors have a great influence on the infection of oat seedlings by the smut organisms.

2 Bartholomew, L. K. and E. S. Jones. Jour. Agr. Res. 14: 569-575. 1923.

Crown or Leaf Rust (Puccinia coronata).

In northern Pennsylvania the farmers called this an "average year" as far as the amount of leaf rust was concerned. In Susquehanna County, fields with plants still in flower were so severely rusted as to be a complete loss, but these fields were the exception.

An interesting development in the control of leaf rust in northern Pennsylvania has been the recent introduction of several leaf-rust-resistant varieties (Vicland, Boone, and Tama), which were developed cooperatively by the United States Department of Agriculture and the Iowa Agricultural Experiment Station. These varieties represented 104.2 acres, or 11% of the total acreage surveyed. As expected, these varieties were free from rust.

In estimating the amount of rust present in a field, the USDA scale for estimating rust severity was used (see USDA Cereal Disease Field Notebook, CI Form 11). For greater clarity in the discussion to follow, the essential parts of this scale are represented here:

Actual % of leaf surface covered by rust	Scale	No. for field reading
37.00	100	6
24.05	65	5
14.80	40	4
9.25	25	3
3.70	10	2
1.85	5	1
0.0	0	0

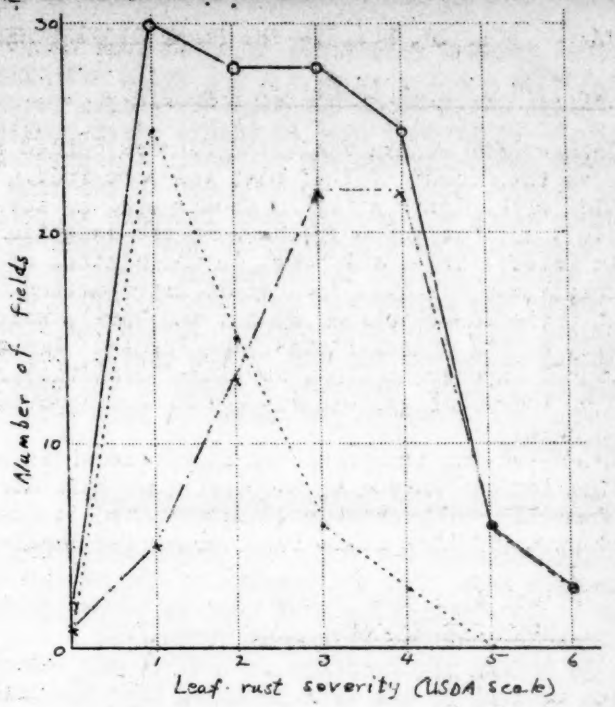
In making the rust counts, leaves from various levels on the stalk were examined in several parts of the field, and each leaf was assigned a value from the scale. An average was computed for the field, based on the figures thus gathered, and the nearest index figure (0-6) was assigned.

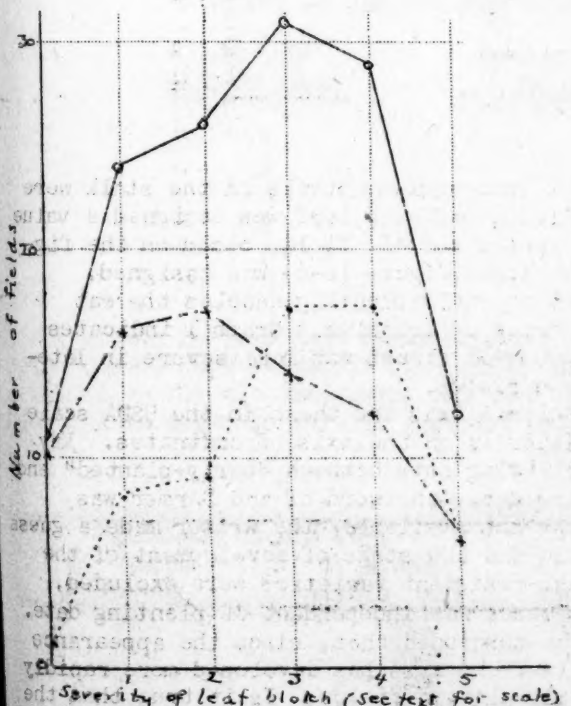
It is a generally accepted fact that early planting enables the oat plant to mature before the rust becomes destructive. Graph 1 indicates that, at the time the survey was made, leaf rust was more severe in late-planted fields than in early-planted fields.

The units of severity on the abscissal axis are those in the USDA scale described above. The number of fields is on the axis of ordinates. May 15 was arbitrarily chosen as the dividing date between "early-planted" and "late-planted" oats. As to planting date, the word of the farmer was taken. In case such information was not available, the writer made a guess based on the appearance of the field and the stage of development of the grain. In making the graph the rust-resistant varieties were excluded, since the absence of rust in these cases was independent of planting date.

From the above graph (1) it may be concluded that, since the appearance of the initial inoculum in oat fields, the rust has developed more rapidly in the late-planted than in the early-planted fields. Is it true that the rust will spread more rapidly in a "young" field than in a more mature one? If so, a type of mature plant resistance is indicated. In a letter to the writer, Dr. H. C. Murphy of the Division of Cereal Crops and Diseases, USDA, states that there is " . . . considerable evidence that oat varieties ex-

Graph 1. Influence of planting date on oat leaf-rust severity in northern Pennsylvania.





before May 15

after May 15

total

Graph 2. Influence of planting date on oat leaf-blotch severity in northern Pennsylvania.

hibit greater resistance to crown rust about the time they reach full maturity . . . . . I would not expect this resistance to become evident until about the time the plants reach the 'dough' stage of maturity." While this type of mature plant resistance noted by Dr. Murphy might partially explain the data, the great majority of the fields were in flower, milk, and early dough at the time the survey was made. On the other hand, the greater rust severity in late-planted fields may be merely a seasonal effect peculiar to this region in 1944. This could be answered by similar surveys in subsequent years in this and other areas.

Since the survey was made over a period of 2 weeks, the possibility exists that the later-planted fields comprised a greater portion of the fields seen near the end of the survey, and that the rust had built up during this time. However, a study of the survey data gave no evidence of a correlation between the amount of rust and the date the field inspection was made.

Leaf Blotch (Helminthosporium avenae)

This disease has received little attention as a factor affecting yield in this area, but the results of the survey indicate that the leaf blotch at least equalled the leaf rust in severity on oats this year in the northern tier counties of Pennsylvania.

In making the readings on leaf blotch severity, an arbitrary standard was devised by the writer, using the USDA rust scale as a model. A standard of 5 measured leaves was prepared and used for comparing the leaves gathered in each field. The scale employed was as follows:

Estimated % of leaf surface covered by leaf blotch	No. for field reading
over 30	5
15-30	4
5-15	3
2-5	2
0-2	1
0	0

According to the survey data, seed-treatment with Ceresan provided a good control for the leaf-blotch, while seed treatment with formaldehyde gave little, if any, improvement over the untreated. In the following table, the figures for leaf blotch severity are the averages of the severity readings given for the fields.

Table 2

Treatment	No. fields	acres	Leaf blotch severity* Based on no. fields	Based on no. acres
Ceresan	32	359.5	1.7	1.7
HCHO	26	152	2.8	3.0
No treatment	46	273	3.1	3.3
Unknown	29	160	2.6	2.6

*See text (above) for scale.

The influence of planting date on the amount of leaf blotch is illustrated in Graph 2. It suggests that in the earlier-planted fields the disease was more severe. This may be because the organism is seed-borne and might be more severe in fields where it has had longer to develop and spread. Another explanation may be that the early rains and late spring in 1944 favored the development of the fungus, which was able to take full advantage of this only in the early-planted fields.

With regard to varietal susceptibility to Helminthosporium avenae, the impression gained on the survey was that the fields of the rust-resistant varieties (Vicland, Boone, and Tama) were usually among the most severely affected.[3] It is conceivable that the absence of rust on these varieties may have created a tendency to judge the leaf blotch more severly. But in cases where a rust-resistant and a rust-susceptible variety were growing side by side and where little rust was present, the leaf blotch was observed to be more severe on the rust-resistant variety. More data on varietal susceptibility to leaf blotch is needed, especially before the growing of these rust-resistant varieties becomes a general practice in this area.

EMERGENCY PLANT DISEASE PREVENTION PROJECT

CORN DISEASES IN NORTH CENTRAL ILLINOIS

J. S. Tidd and G. H. Boewe

An intensive survey of 15 plantings of field corn across north-central Illinois for ear and stalk rots was made from October 17 to 20. The fields averaged from 20 to 80 acres in size. Although harvesting was in progress in many plantings in the area covered and an attempt was made to choose fields as near maturity as possible, an average of 33% of the stalks in the fields sampled were sappy and some of the leaves had been frosted.

One hundred plants from each field were examined critically. As was to be expected, some stalks and ears were found with more than one pathogen present. This data was tabulated but is not included in this report. Data was also obtained as to whether infected ears were covered by the husks, whether worm injury was present, and whether diseased kernels were at the tip, butt, or scattered. Also noted was the severity of infection on individual ears. This data will probably be used by workers consulting the notes of the Illinois Natural History Survey. Only prevalence of diseased stalks or ears is recorded in Table 1. All fields were yellow dent varieties (probably hybrids) except one field (65% sappy) in Kankakee county which was a white dent variety.

In addition to the diseases in the table, Phaeocytosporella zeae was also found. Not counting the 30-acre field surveyed in DeWitt county, where this organism was fruiting on 20% of the stalks, it was present on 1.07% of all plants examined. Smut (Ustilago maydis) was present on 2.27% of all plants. Less than 1% or .6% of all ears examined were smutted. Black bundle (Cephalosporium acremonium and other causes) was

---

[3] [H. R. Rosen reported similar observations in Arkansas (PDR 26 (21): 455-457, Nov. 15, 1942)]

Table 1. Corn ear and stalk rot in north central Illinois. October 17-20, 1944

County	Size of planting acres	Sappy stalks	Per cent of plants with: Diplodia zeae Stalk rot	Diplodia zeae Ear rot	Gibberella zeae Stalk rot	Gibberella zeae Ear rot	Nigrospora sphaerica Ear rot	Fusarium sp. Ear rot	Penicillium sp. Ear rot	Aspergillus sp. Ear rot	Rhizopus nigricans Ear rot
DeWitt	30	10	67	4	22	0	0	29	14	5	1
McLean	40	52	31	1	13	0	0	69	20	0	3
McLean	80	25	53	0	15	1	3	60	19	0	0
Schuyler	40	40	52	2	46	1	13	28	11	0	0
Brown	30	70	31	2	44	1	3	23	19	1	0
Brown	40	30	55	0	19	2	1	45	24	0	2
Hancock	40	6	79	7	20	0	1	16	9	0	4
Knox	40	30	55	3	14	1	13	25	6	0	1
Knox	40	20	50	0	10	1	2	33	9	0	0
Stark	40	60	41	2	12	0	2	30	7	0	0
Marshall	20	25	52	0	18	1	1	20	11	0	1
Kankakee	40	65	37	0	13	0	1	67	8	0	0
Kankakee	40	10	78	1	0	0	0	10	4	0	0
Iroquois	20	40	52	2	7	0	0	29	10	0	0
Iroquois	40	15	63	9	36	1	2	18	6	0	0
Averages		33	53	2.2	19.3	.6	2.8	34.13	11.8	.4	.8

present in all fields except one to the extent of 3.7%. Most of these plants were barren.

Losses from the various diseases are not given in this report.

EMERGENCY PLANT DISEASE PREVENTION PROJECT AND
ILLINOIS NATURAL HISTORY SURVEY

ROTS OF RUNNER PEANUTS IN SOUTHEASTERN ALABAMA

G. M. Stone and Coyt Wilson

The senior writer reported on peanut diseases in southeastern Alabama earlier in the season (PDR 28(28);887). In this report disease index figures were given on peg rots. Because of the importance of this crop in the State, it was thought desirable to have more accurate figures on actual losses resulting from rotting of peanuts in the soil.

For this study samples of peanuts were taken from average to better-than-average fields located at widely separated points in the 4 leading peanut-producing counties of the State. The plants were carefully forked from the soil, brought into the laboratory, and dried out as rapidly as possible. The peanuts were picked off and washed, and fruits from each sample were classified according to the amount of disease. The findings of the survey are given in Table 1.

Before discussing the figures in Table 1, the difficulties involved in obtaining accurate figures on peanut losses caused by fungi or other organisms should be noted. As the peanut reaches maturity, the peduncle becomes brittle and consequently is easily broken off. Factors other than maturity that hasten this condition are (1) premature loss of leaves from disease or insect action, and (2) invasion of the peduncle by microorganisms. Therefore, to judge losses due to disease from samples taken at any time other than the actual digging date, is speculation. However, the error incurred when samples are taken before maturity tends quite definitely to a conservative rather than an exaggerated estimate. All the samples involved here were taken prior to the time of digging.

In the last column of the Table is given the percentage of total loss, that is, the percentage of peanuts completely rotted at the time the samples were taken. It would be fairly safe to assume that at least half or more of the fruits under "severe damage" would also be lost. This would give a conservatively estimated loss of about 12 to 15% for the above samples.

Possibly the number of samples taken is not great enough to use as a basis for estimating the amount of loss for the area in question (about a half million acres). However, the writers are confident that, based on the figures given here and also on repeated field observations the estimated loss of 12 to 15% is conservative. Even if the estimate is reduced to 10%, the loss to the section is about three million dollars at the present price of peanuts.

Isolations in the laboratory revealed that the predominant organism associated with the fruit rots was Sclerotium rolfsii. However, this fungus was confined mainly to the shells and peduncles. Only rarely was it isolated from the seed. The microflora of seed and shells of damaged fruits was found to be entirely different. A report of this will be submitted later.

Table 1 Rots of Runner Peanuts in Southern Alabama

Sample Number	Location	Number of Peanuts: Sound Fruit	Slight Damage	Severe Damage	Completely Rotted	% of Total Loss[a]
1	Dothan Section	43	71	17	26	14
2		30	76	43	32	18
3		199	64	17	20	6
4		121	353	93	48	8
5		57	205	45	44	13
6		133	47	26	45	18
7		211	54	28	21	7
8		138	159	14	13	4
9	Headland Section	118	254	62	30	6
10		57	211	31	32	10
11		75	249	54	35	8
12		158	286	40	18	4
13		124	221	40	32	8
14	Abbeville Section	49	226	45	23	7
15		146	356	56	26	4
16		160	145	52	27	7
17		134	242	50	31	7
18		88	205	22	35	10
19		173	49	44	14	5
Average % Loss						8.6

[a]At time samples were taken

Emergency Plant Disease Prevention Project,
and Alabama Agricultural Experiment Station

DISEASES OF PEANUTS IN NORTH CAROLINA

Alton E. Prince

Twelve peanut fields varying in size from 2 to 40 acres and totaling 148 acres were inspected and others observed in Nash, Edgecombe, Halifax, Northhampton, Bertie, and Martin Counties, in eastern North Carolina, during the week of October 9.

Collections were made from stacks in 7 representative fields and sent to Dr. Lindsay S. Olive, for the determination of associated fungi. Sclerotium rolfsii was present in most fields, and one was inspected in Edgecombe County where according to H. C. Scott, assistant county agent, nearly 50% of the plants had been killed by this fungus. It is noteworthy that S. rolfsii was not found by Dr. Olive, but Fusarium species were present in pegs and pods of all collections sent and seemed to be the most important.

Since peg rots are very important, care was taken to collect peanuts

with the diseased pegs attached and from these the only evident fungus obtained was Fusarium. Nematodes were present. On the pods the associated organisms were Fusarium, Cladosporium, Penicillium, Melanospora, Sclerochaeta, nematodes, and mites. Where fissuring of the pods occurred the nematodes were probably the principal pathogen.

Some collections showed a pink to reddish discloration on the pods and seeds, and according to County Agent G. E. Grant of Bertie County, this pink peanut disease is one of the most important on peanuts in his area. Dr. Olive found a Fusarium to be associated, and cultures of my own confirm this.

An estimate was made in several fields as to the amount of peanuts left after digging and in some there were serious losses. At the present price of 8 cents a pound it was estimated that where no control measures for the leaf-spot fungus were being carried out, the growers were leaving from $20 to $50 worth of peanuts per acre in the ground. Where dust was properly applied the amount of peanuts left was negligible.

EMERGENCY PLANT DISEASE PREVENTION PROJECT